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ASSIGNMENT BOOKLET

9110 Mathematics 9
Module 5

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MATHEMATICS 9

MODULE 5

Measurement and Geometry

ASSIGNMENT BOOKLET

Distance Learning

Alberta EDUCATION

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 1 Assignment	25	
Section 2 Assignment	25	
Section 3 Assignment	25	
Final Module Assignment	25	
	100	

Teacher's Comments

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Parents	
General Public	
Other	

Mathematics 9
Assignment Booklet
Module 5
Measurement and Geometry
Learning Technologies Branch
ISBN 0-7741-1392-8

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ASSIGNMENT BOOKLET
MATHEMATICS 9 – MODULE 5: MEASUREMENT AND GEOMETRY

Your mark on this module will be determined by how well you do your assignments in this booklet.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate section.

There are two section assignments and one final module assignment in this Assignment Booklet. The total value of these assignments is 100 marks. The value of each assignment is stated in the left margin.

This Assignment Booklet may be completed with the use of a calculator and resource materials. However, you must do the assignment **independently**.

You may do your rough work on your own paper.

Be sure to proofread each assignment carefully.

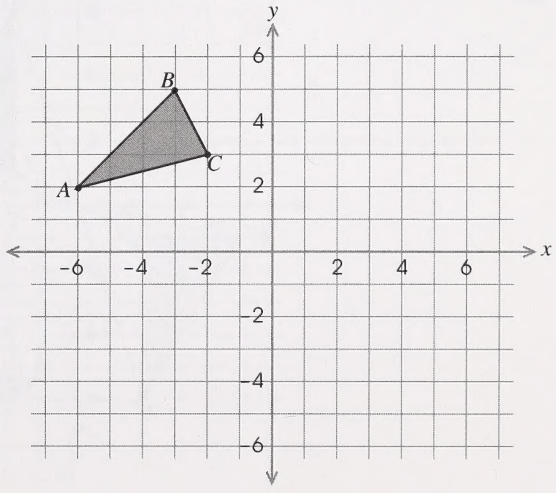
Section 1 Assignment: Transformations

25

Read all the parts of your assignment carefully and record your answers in the appropriate place.

(3) **1.** Complete each of the following transformations of ΔABC on the coordinate grid given.

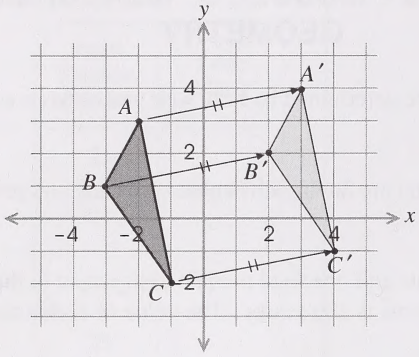
- Translate ΔABC using the mapping rule $(x, y) \rightarrow (x+5, y-1)$. Label the vertices A', B', and C'.
- Reflect ΔABC about the x-axis. Label the vertices A'', B'', and C''.
- Rotate ΔABC a $\frac{1}{2}$ turn about the origin. Label the vertices A''', B''', and C'''.



2. Describe the property that is being illustrated in each of the following transformations.

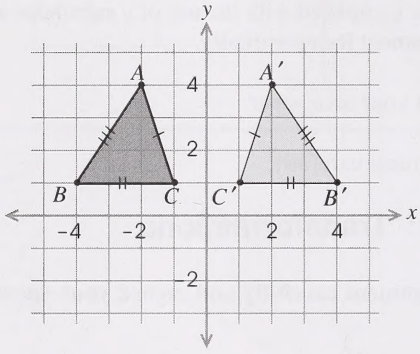
(1)

a.



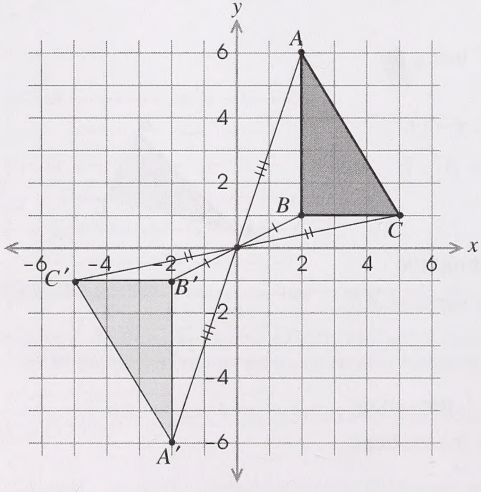
(1)

b.



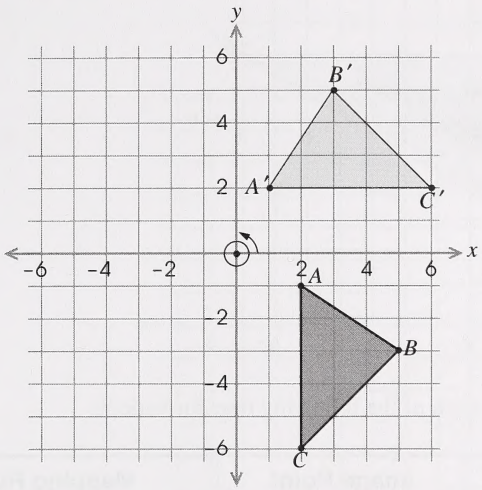
(1)

c.



3. Write the mapping rule used to complete each of the following transformations.

(1) **a.**



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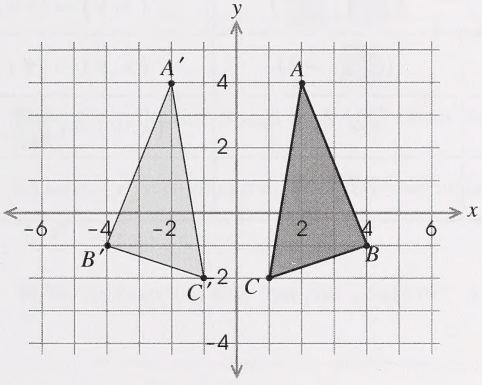
(1) **b.**



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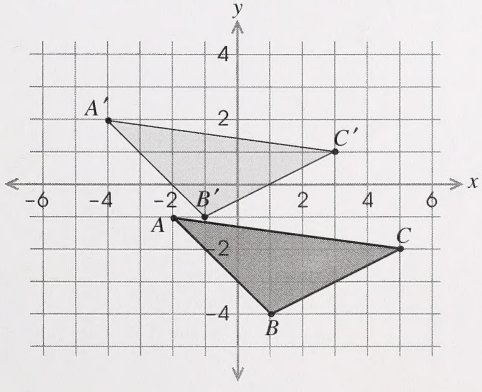
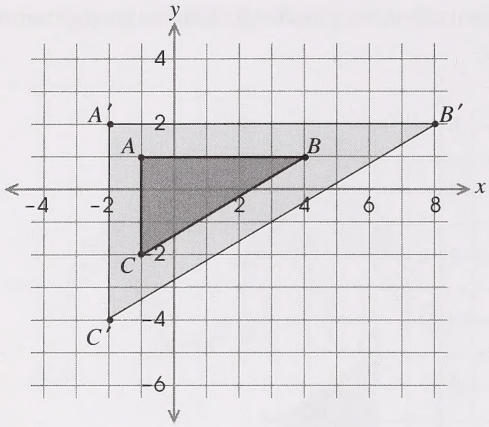
(1) **c.**



_____

(1)

d.

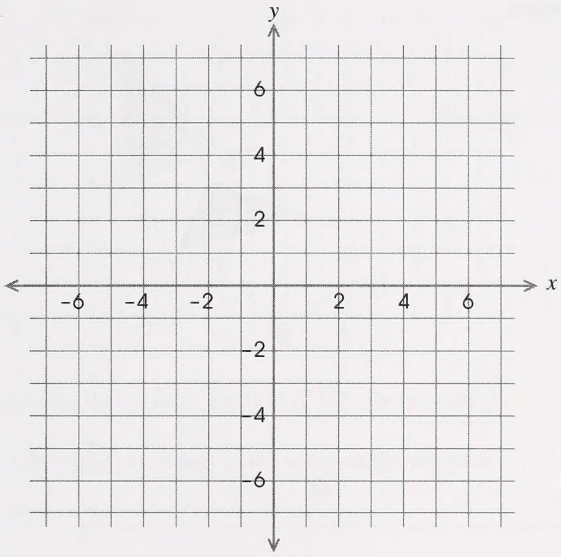


(4)

4. Complete the chart for each of the following transformations.

Object Point	Image Point	Mapping Rule
(2, 4)	(□, □)	$(x, y) \rightarrow (-x, -y)$
(4, □)	(□, −2)	$(x, y) \rightarrow (x+3, y)$
(8, −4)	(4, −2)	$(x, y) \rightarrow$ (□, □)
(□, □)	(3, −4)	$(x, y) \rightarrow (x, -y)$

(1) **5. a.** Draw ΔABC with coordinates $A(-2,6)$, $B(-2,2)$, and $C(-5,2)$ on the following coordinate grid.



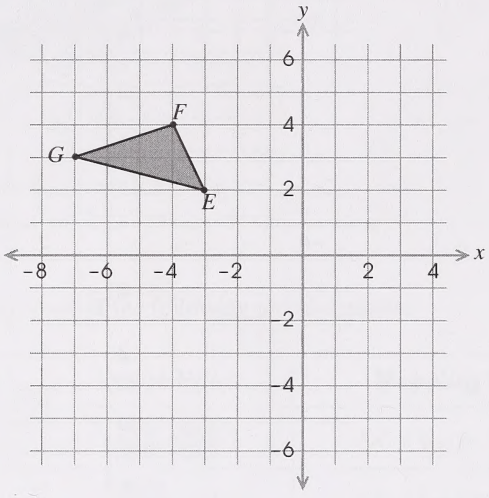
(1) **b.** Draw the reflection image of ΔABC about the y-axis. Label the image $A'B'C'$.

(1) **c.** Draw the $\frac{1}{2}$-turn image of $\Delta A'B'C'$ about the point $(0,0)$. Label the image $A''B''C''$.

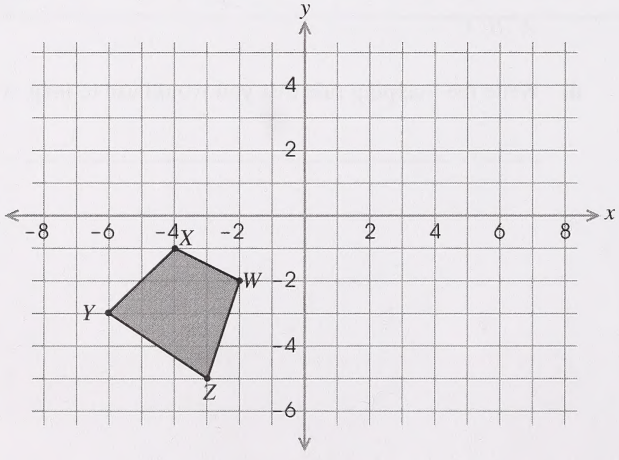
(1) **d.** Write the mapping rule that you would use to map ΔABC onto $\Delta A''B''C''$.

_____

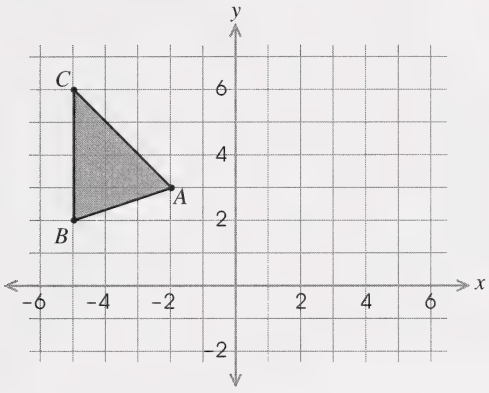
(2) **6.** Triangle EFG is shown on the following coordinate grid. Locate a line of reflection such that the image of ΔEFG will be located entirely in the third quadrant. Draw a possible image of ΔEFG. Restrict your value for the equation of the line of reflection to the set of integers.



(3) **7.** Draw the reflection image of quadrilateral $WXYZ$ about the line $x = 1$. State the coordinates of both $WXYZ$ and $W'X'Y'Z'$.



8. A triangle with coordinates $A(-2,3)$, $B(-5,2)$, and $C(-5,6)$ is given.



(1) **a.** Draw the resulting image for a rotation of 90° about point A.

(1) **b.** Explain how the resulting image is the same as the original.

_____

_____

(25)

Section 2 Assignment: Measurement and 2-D and 3-D Figures

Read all the parts of your assignment carefully and record your answers in the appropriate place.

1. A cow is grazing in a rectangular field that is 70 m by 50 m. The cow is tied to a post in the centre of the area with a rope that is 20 m long.

(2) **a.** Sketch the locus that shows the area in which the cow cannot graze.

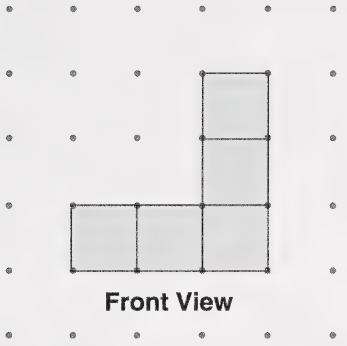
(2) **b.** Calculate the area of grass that the cow cannot graze. Round your answer to the nearest whole number.

2. Sophia wants to rope off a display area in her jewellery store. She has 6 m of rope to block off two sides using two walls for the other two sides.

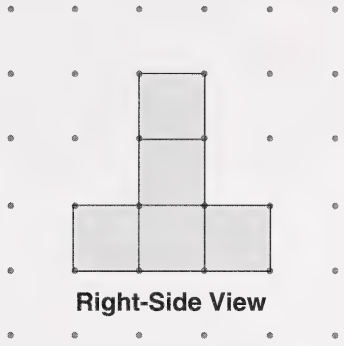
(1) **a.** Draw the locus of points that shows the largest area she can rope off.

(1) **b.** Calculate the area of the display area.

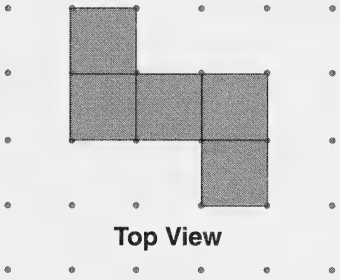
(3) **3.** Draw a three-dimensional shape on the isometric dot paper provided from the following two-dimensional views.



Front View



Right-Side View

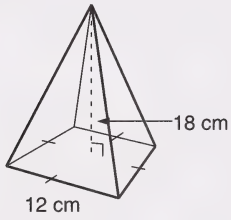


Top View

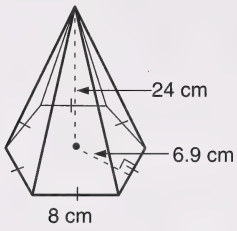
(4)

4. Find the volume of each pyramid. Write the formula and solve.

a.



b.



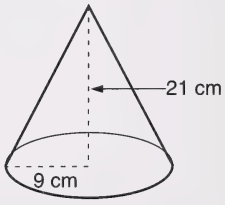
(1)

5. If you double the dimensions (length, width, and height) of a rectangular pyramid, how does this affect the volume?

_____

_____

6. Use the cone on the right to answer the following questions.



(2)

a. Find the volume of the cone. Write the formula and solve. Round your answer to the nearest whole number.

(1) **b.** If you cut the cone off (level with the base) one-third of the way down from the apex, what will be the volume of the portion of the cone that is cut off? (**Hint:** One-third of the way down from the apex, the radius will be one-third that of the radius of the base.)

(1) **7.** The volume of a cone is $24\ cm^3$. What is the volume of a cylinder with the same base and height?

(2) **8.** Fill in the blanks in the following statement.

If you double the length of the sides of a cube, then its surface area increases _____ and its volume increases _____.

9. Calculate the maximum number of 6 cm by 6 cm by 6 cm boxes that can be shipped in the following containers.

(1) **a.** a 24 cm by 24 cm by 24 cm container

(1) **b.** a 36 cm by 36 cm by 36 cm container

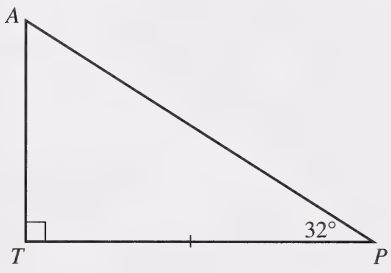
(3) **10.** Use surface area to show which container in question 9 is more cost-effective.

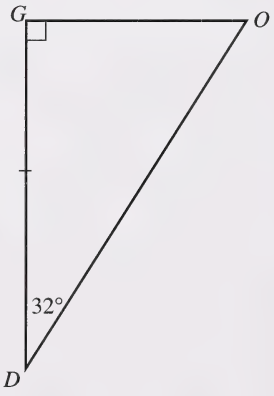
(25)

Section 3 Assignment: Triangles and Trigonometry

Read all the parts of your assignment carefully and record your answers in the appropriate place.

1. The following two triangles are congruent.





(1) **a.** Write the congruency statement that indicates the two triangles are congruent.

_____

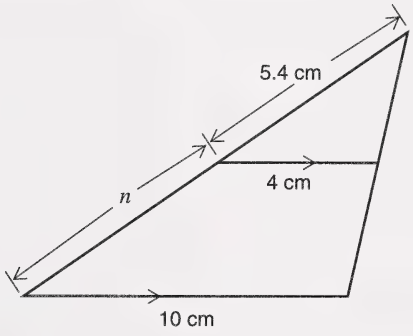
(1) **b.** Under what conditions are the two triangles shown to be congruent?

_____

(1) **c.** What is the measure of $\angle O$?

(2) **d.** List all the corresponding congruent parts of the two triangles.

2. Use the diagram given to answer the following questions.



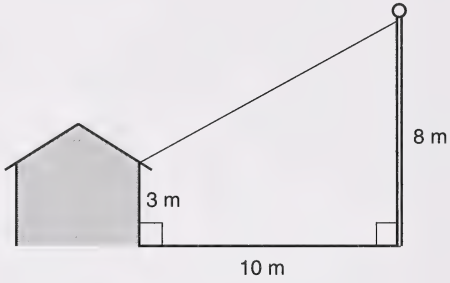
(1) **a.** What is the proportion you would use to find the value of n?

(1) **b.** What is the value of n?

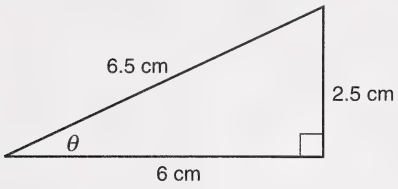
(2) **3.** Write two statements about what the following similarity statement says about the two triangles.

$\Delta ABC \sim \Delta DEF$

(2) **4.** Find the length of the wire going from the house to the top of the pole. Show the steps used, and round your answer to one decimal place.



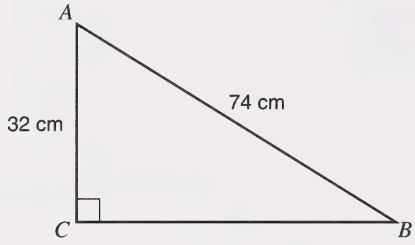
Use the following diagram to answer questions 5 and 6.



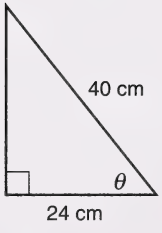
(1) **5.** Find $\sin \theta$. Express your answer as a fraction (in simplest form) and as a decimal (rounded to three decimal places).

(2) **6.** Use the sine ratio to find the measure of $\angle\theta$ to the nearest degree. Show the keystroke sequence used to find the answer.

(3) **7.** Determine the measures of all the unknown sides and angles in ΔABC. Round your answers to the nearest whole number. Show the steps used.



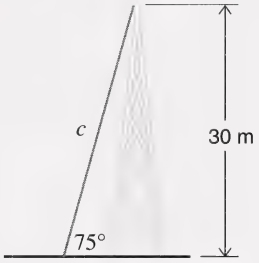
(1) **8.** Calculate the measure of $\angle\theta$ to the nearest degree.



(2) **9.** A tree casts a shadow that is 11.2 m long. If the Sun's rays make a 38° angle with the ground, then how tall is the tree (rounded to the nearest tenth of a metre)? Show the steps used in solving.

Use the following information to answer questions 10 and 11.

A radio station uses radio towers to broadcast its signal across the country. These towers are supported by cables attached to the ground. The towers are each 30 m tall, and the supporting cables make a 75° angle with the ground.



(2) **10.** How long must each cable be (allow 1 m for fastening)? Show the steps and round your answer to one decimal place.

(1) **11.** How far away from the centre of the base of the tower are the cables fastened to the ground?

(2) **12.** An airplane at an altitude of 4.2 km is descending towards the airport at an angle of 14° with the ground. If the airplane is 15.6 km (along the ground) from the start of the runway, is it going to land on the runway if it maintains its present course? Explain your answer by using a diagram and calculations that show where the airplane will land or that show the required angle of descent.

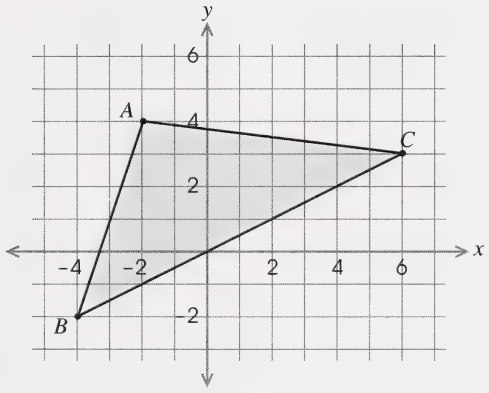
25

Final Module Assignment

Read all the parts of your assignment carefully and record your answers in the appropriate place.

(2) **1.** Draw $\Delta CAT \cong \Delta DOG$. Label them in the appropriate manner to show they are congruent by SAS.

(1) **2. a.** Draw the image of ΔABC using the mapping rule $(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$. Label its coordinate A', B', and C'.



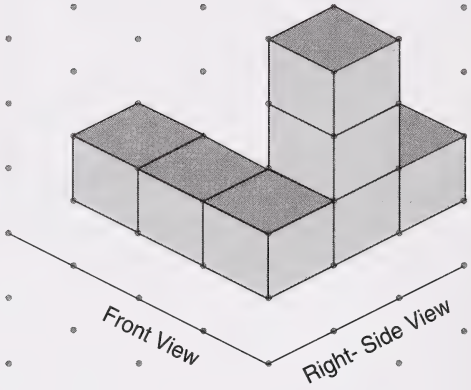
(1) **b.** What is the scale factor for ΔABC and $\Delta A'B'C'$?

_____

(2) **c.** If $AB = 4.8$ cm, what is the measure of $A'B'$?

(2) **3.** Sketch the points traced by a point on a bicycle tire as it rotates down the road.

(3) **4.** Sketch the front view, right-side view, and top view of the 3-D drawing on the square dot paper provided.



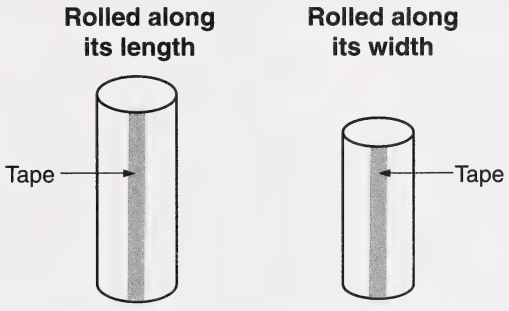
(1) **5.** A cube has all of its dimensions reduced by a factor of one-quarter. How is the volume of the cube affected?

6. Perform the following activity; then answer the questions that follow.

Step 1: Take two standard sheets of paper (21.5 cm by 28 cm) and tape them onto heavier paper. Cut out the heavier paper along the edge of the taped sheets.

Step 2: Roll one net into a cylinder along its length and tape it together so the edges just meet. Roll the other net along its width and tape it so the edges just meet.

Step 3: Hold one cylinder in your hand so that the end is as close as possible to a circle. Measure the diameter. Use a compass to make a bottom for the cylinder. Tape the bottom to the cylinder. Do the same with the other cylinder.



(1) **a.** Do the two cylinders have the same surface area? Why?

_____

_____

(1) **b.** Predict if the volumes are the same, and, if not, which has the larger volume?

_____

_____

(1)

c. Use a measuring cup and a material like rice or sand to determine the volume of each. Was your prediction correct?

(4)

d. Calculate the radius for each cylinder from its circumference and calculate the volume for each cylinder using the formula for a cylinder. Do your calculations confirm the volume you measured?

(1)

e. A cone is made in each of the cylinders with the same radius and height as the cylinder. Which cone has the greater volume?

(3) **7.** A train track rises 70 m over a horizontal distance of 1.6 km. What is the angle of elevation of the track to the nearest tenth of a degree? Show the calculator sequence needed to solve this problem.

(2) **8.** Randy uses a clinometer to measure the angle of depression from the top of a cliff, 60 m above the river, to a point directly across the river. He finds the angle of depression to be 25°. Find the width of the river to the nearest metre. Show the calculator sequence needed to solve this problem.

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The Student's Declaration is to be filled in by a student registered at the Alberta Distance Learning Centre. If the student is under 16, the Learning Facilitator's Declaration is to be filled in by the learning facilitator. Failure to complete this page may invalidate the assignment results.

STUDENT'S DECLARATION

- I have followed the instructions outlined in the Student Module Booklet.
- I have completed the activities to prepare myself for the assignments in this Assignment Booklet.
- I completed the assignments in this Assignment Booklet by myself.

_____

Student's Signature

LEARNING FACILITATOR'S DECLARATION

I hereby certify that I have supervised the learning activities completed by _____.

Student's Name

I also certify that to the best of my knowledge the assignments in this Assignment Booklet were completed independently by this student.

_____

Supervisor's Signature

If you, the student or learning facilitator, have any comments or observations regarding this module, write them in the following space.

_____

_____

_____

_____

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_____

_____

_____

Mathematics 9
Assignment Booklet
Module 5

LRDC
Producer

1997